

AN INSIGHT INTO BIODIVERSITY: PROSPECTS AND CHALLENGES

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ABSTRACT

Variety and variability of life on this earth is biodiversity. It is categorized as species diversity, genetic diversity and ecosystem diversity. Two concepts are deployed to assess biological diversity, namely species richness and evenness. While measuring biological diversity, it is also important to assess biodiversity on a spatial scale. For this convenience, different measures are evolved such as alpha, beta and gamma diversity. In the current scenario of biological diversity bleaching, valuation of direct and indirect benefits of biodiversity has a key role to play in its conservation. Identification of the causes to biodiversity loss is key to contribute to the conservation of bio-resources. It is our duty to put efforts for conservation of existing biodiversity and reduce the risk of extinction. Conservation of biodiversity can be done in in-situ or ex-situ. A holistic approach of protection, conservation and sustainable utilization of bio-resources should be implemented by partnering a wide array of stakeholder's for effective conservation of biological diversity.

KEYWORDS: Biodiversity, Conservation, In-Situ & Ex-Situ

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INTRODUCTION

Biodiversity

Biological Diversity is everything living around. The definition, as advocated by the Convention on Biological Diversity (CBD) in the year 1992 (1) states that biological diversity means, the “variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

As said above biological diversity is the variety and variability of life. Biodiversity can be conceptualized as 1. Diversity of species: the variety of living forms. 2. Genetic diversity: the variety of genetic information contained in all distinct populations of the species 3. Ecosystem diversity: the variety of habitats or ecosystems (2), for example, diversity within the Himalayan mountain chain ecosystems or the Thar Desert biome.

ASSESSMENT OF BIOLOGICAL DIVERSITY

In the current context of human population explosion and global climatic change, few fundamental questions pertaining to biological diversity are often asked, such as what is biodiversity, where it can be found, is biological diversity is increasing or decreasing, if so, at what rate? In order to answer these fundamental questions, one should quantify or measure the existing biological diversity. Two concepts are deployed to assess biological diversity, namely species richness and evenness. Species Richness is the simplest and oldest concept of measuring diversity by assessing the number of species in the community or the region (3). Evenness measures attempt to quantify the unequal representation against a hypothetical community, in which, all species are equally common (4).

While measuring biological diversity, it is also important to assess biodiversity on a spatial scale. For this convenience, different measures are evolved such as alpha, beta and gamma diversity. Alpha diversity is diversity within a particular area, community or ecosystem and it is a simple count of the number of species within that area. Beta diversity is the species diversity between areas and involves comparing the number of species that are unique to each area. Gamma diversity is a measure of the overall diversity across a region (5, 6).

VALUE OF BIODIVERSITY

Human is one of the species in infinite biodiversity on earth, like any other organism or species on this Earth, he is dependent on other living forms directly or indirectly for his own existence. For example, human survival depends on bio-resources for breathing, food, feed, medicine and material, etc. In the current scenario of biological diversity, bleaching, valuation of biodiversity has a key role to play in its conservation. The various measures of biodiversity valuation as mentioned figure 1.

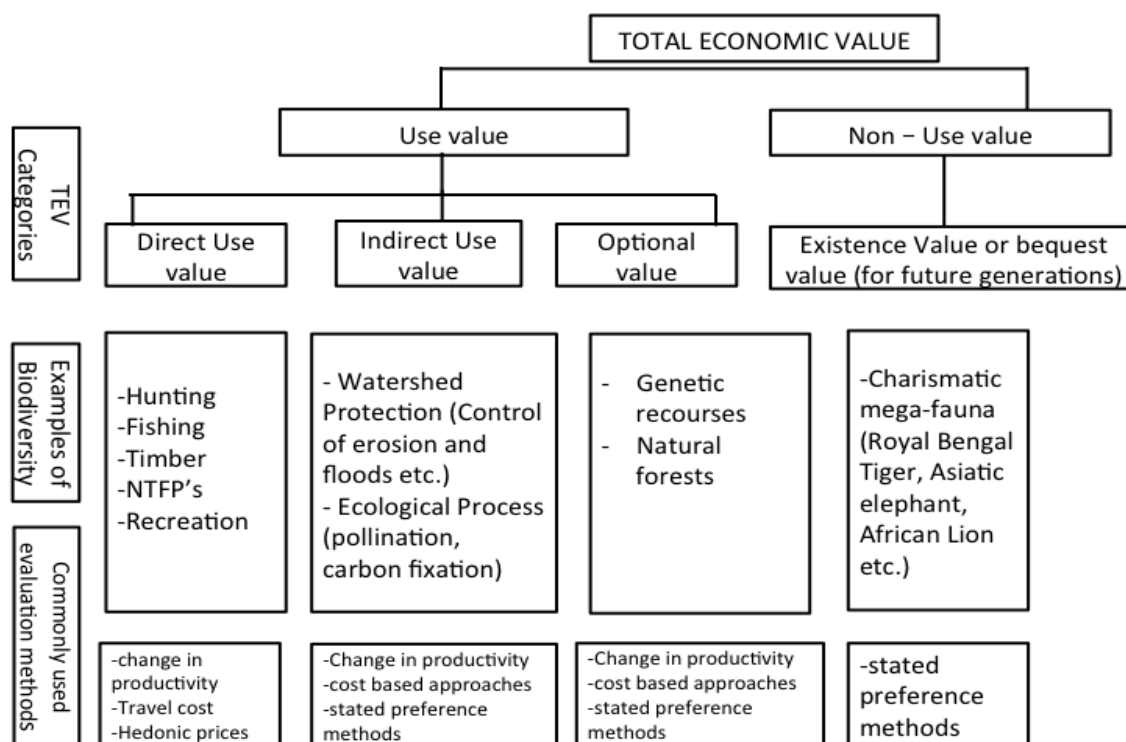


Figure 1: Valuation of Biodiversity

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LOSS OF BIODIVERSITY

Though evolution and extinction are a natural phenomenon, it is certain that human greed and arrogance have escalated the rate of species extinction dramatically, over the background rates over the planet's history. One of the largest assessments of the effect of humans on the Earth's ecosystems was initiated in the year 2000, called the Millennium Ecosystem Assessment (MEA). Over the past 50-70 years, humans have altered this earth more swiftly than in any comparable period of time in history, leading to substantial and irrecoverable loss of the global ecosystem as whole.

According to Millennium Ecosystem Assessment (MEA) report published in the year 2005, 10-30 percent of amphibian, bird and mammal species are seriously threatened with extinction as a result of continuous abuse in the form of over-exploiting, global climate change as driven by anthropogenic arrogance, invasive species, and nutrient loading pushing ecosystems towards their limits that they might otherwise not experienced (8).

The causes of biodiversity loss can be summarized as follows: Alteration and loss of the habitats by the transformation, habitat degradation and fragmentation of the natural areas for undertaking developmental activities such as building dams; open-cast mining and other major developmental activities, which have led to loss of habitat of various biological species pushing them towards extinction. Human created genetically modified organisms and introduction of exotic species can lead to different forms of imbalance in the equilibrium of ecosystems. The human driven climate change affects biodiversity, because it alters and endangers the habitats of species, making them unable to continue their existence. Overexploitation of resources to fulfill the greed of human is a major driver causing loss of biodiversity, when activities such as farming, timber extraction, fishing and hunting, etc., carried out unsustainably may cause severe loss of regional biodiversity (9).

BIODIVERSITY CONSERVATION- METHODS AND STRATEGIES

Habitat loss, habitat degradation and fragmentation, reckless exploitation of ecosystems, human driven climatic changes, invasive species, pollution, and unsustainable land use patterns such as shifting cultivation, unrestricted hunting and many other kinds of anthropogenic arrogance is causing immense loss of biodiversity. So, it is to be understood that human is at the apex of the utilization of bio-recourses pyramid. It is our duty to put efforts for conservation of existing biodiversity and reduce the risk of extinction. Conservation, when simplified, can be understood as offering protection for existing biological diversity, upliftment and scientific management of biodiversity, in order to maintain it, and simultaneously reap sustainable benefits from the bio-recourses for our generation and enabling future generations.

Conservation of biodiversity can be done in in-situ or ex-situ. The conservation of bio-resources in their natural habitat is known as in situ conservation. For conserving a particular species or community, the surroundings of the habitat or ecosystem should be protected and, the driving forces threatening the survival of the species should be identified and eliminated. The protection and management of biodiversity in-situ conservation involve certain specific areas known as protected areas, which include national parks, Sanctuaries and Biosphere reserves etc.

CONCLUSIONS

Ex-situ conservation: Often conservationists and ecologist encounter problems in conserving the bio-recourses in-situ, perhaps due to the remoteness of the terrain, danger of epidemics in-situ or may be anthropogenic interference, etc. When bio-resources are maintained outside the natural habitat this method of conservation is known as ex-situ conservation. The major forms of ex-situ conservation measures are a seed gene bank, field gene bank, botanical gardens and zoos, etc. The conservation efforts outside of the natural habitat need certain strategies very firstly we need to identify the species for conservation, followed by deploying various ex-situ conservation measures as above said. For the species, which have lost their natural habitat, completely or heavily degraded long term breeding programs and relocation schedules should be developed. Advanced technology can be utilized like tissue culture and other cloning technologies (10).

A holistic approach of protection, conservation and sustainable utilization of bio-resources should be implemented by partnering a wide array of stakeholder's for effective conservation of biological diversity.

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